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2nd International Workshop on the Twin Peaks of Requirements and Architecture (TwinPeaks 2013)

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2nd International Workshop on the Twin Peaks of Requirements and Architecture (TwinPeaks 2013)

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Abstract—The disciplines of requirements engineering (RE) and software architecture (SA) are fundamental to the success of software projects. Even though RE and SA are often considered separately, it has been argued that drawing a line between RE and SA is neither feasible nor reasonable as requirements and architectural design processes impact each other. Requirements are constrained by what is feasible technically and also by time and budget restrictions. On the other hand, feedback from the architecture leads to renegotiating architecturally significant requirements with stakeholders. The topic of bridging RE and SA has been discussed in both the RE and SA communities, but mostly independently. Therefore, the motivation for this ICSE workshop is to bring both communities together in order to identify key issues, explore the state of the art in research and practice, identify emerging trends, and define challenges related to the transition and the relationship between RE and SA.

Index Terms—Requirements engineering, software architecture, twin peaks.

I. OVERVIEW

The workshop addresses the issues and challenges introduced by the strong interdependencies between requirements and architecture using the Twin Peaks model [1]. This model draws attention to the synergistic relationship between requirements and architectural design and emphasizes the need to progressively discover and specify requirements while concurrently exploring alternative architectural decisions.

RE is concerned with eliciting, analyzing, specifying, and managing the requirements of a system. Major issues in RE include requirements gathering, modeling, analysis, prioritization, and formal and informal specification of requirements. In contrast, the discipline of SA focuses on designing feasible solutions to satisfy a system's functional and

quality requirements. SA models embody the structure and behavior of a software system and fundamental design decisions that help achieve quality goals. A good architecture helps implement requirements, at an acceptable level of quality and within time and budget. The architecture defines coarse-grained software components, including their properties, relationships, patterns of interactions, and the architectural decisions by which they were shaped.

Even though activities performed in the RE and SA disciplines are often considered separately, drawing a line between RE and SA is not realistic as requirements and architectures impact each other. In practice, “architecting” starts as soon as an initial understanding of the requirements is achieved. The tasks of requirements discovery and architectural design therefore need to be interwoven such that requirements are discovered and specified while architectural decisions are incrementally explored [2]. In practice this is addressed through communication that occurs between architects, requirements analysts, and project stakeholders.

II. WORKSHOP GOALS

The goal of the workshop is to provide a venue for researchers, practitioners and educators from the areas of RE and SA to discuss their experiences, forge new collaborations, and explore innovative solutions that address the challenges of the Twin Peaks model. The workshop provides participants with an opportunity to become familiar with the relationship between RE and SA in the greater context of software engineering, rather than in an isolated context of either RE or SA. The outcomes of the workshop are expected to be an improved understanding of key issues and challenges at the intersection of RE and SA, an understanding of the state of the

art in research and practice, and a list of outstanding issues that will contribute towards establishing a research agenda for future researchers in the field.

III. RELEVANCE

RE and SA are established areas of software engineering research, education and practice. However, problems tend to occur either when architects do not fully understand the needs of stakeholders and therefore solve the wrong problem, or when stakeholders specify unrealistic requirements without understanding the tradeoffs they introduce in terms of cost, schedule, and with respect to other quality concerns.

RE practices are designed to reduce problems such as incorrect and/or missing requirements; however requirements knowledge must be communicated to architects in order to ensure that the right system is designed and built. The existing gap between RE and SA is at least partially caused by lack of interaction between the two communities. For example, both communities have their own paradigms (meta-models, languages, methods) and publish results at different venues. The TwinPeaks workshop is specifically designed to strengthen the bridge between the two communities, to build an understanding of the necessary dependencies, and to build a shared agenda for collaboration.

IV. ACCEPTED PAPERS

The workshop is open to all ICSE 2013 attendees, but presentations were selected based on reviewing submitted papers. The following papers were accepted for presentation at the workshop (listed in alphabetical order, based on the last name of the first author):

- Stephany Bellomo, Ipek Ozkaya, Robert Nord, Elaboration on an Integrated Architecture and Requirements Practice; Prototyping with Quality Attribute Focus.
- Zoya Durdik, Anne Koziolk, Ralf Reussner, How the Understanding of the Effects of Design Decisions Informs Requirements Engineering.
- Hassan Gomaa, Evolving Software Requirements and Architectures Using Software Product Line Concepts.
- Mats Heimdahl, Lian Duan, Anitha Murugesan, Sanjai Rayadurgam, Modeling and Requirements on the Physical Side of Cyber-Physical Systems.
- Naomi Unkelos-Shpigel, Irit Hadar, A Multitude of Requirements and yet Sole Deployment Architecture: Predictors of Successful Software Deployment.

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REFERENCES

- [1] B. Nuseibeh. Weaving together requirements and architectures. *IEEE Computer*, 34:115–117, 2001.
- [2] L. Bass, P. Clements, and R. Kazman, 2003. *Software Architecture in Practice*. Addison-Wesley, Boston, MA.

* Workshop co-organizers are listed alphabetically.